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BACKGROUND AND MOTIVATIONAL CHARACTERISTICS OF MEDICAL OFFICER CANDIDATES FOR THE SUBMARINE SERVICE

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Bureau of Medicine and Surgery, Navy Department
Research Work Unit MF12.524.003-9008.01

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SUMMARY PAGE

THE PROBLEM

To identify background and motivational factors which may account for a Medical Officer's volunteering for the Submarine Service.

FINDINGS

Many of the NSMO's (Non-Submarine Medical Officers) were in medical residency, an option not immediately open to the PSMO's (Prospective Submarine Medical Officers). Moreover, most NSMO's who had not taken residencies planned to do so while in the Navy. In contrast, most PSMO's planned to take residencies following their active military duty. The NS MO's were somewhat senior to the PSMO's and had longer active duty experience, although all were equivalent in rank (Lieutenant). Compared with the NSMO's, the PSMO's had interest patterns more similar to physicians, engineers and physical scientists on the Strong Vocational Interest Blank (SVIB). Approximately three-fourths of each group indicated that opportunities for professional development influenced their decisions to join the Navy.

APPLICATION

It is possible that a program designed to apprise PSMO's of educational opportunities in the Navy early in their careers would affect the long term retention situation favorably.

ADMINISTRATIVE INFORMATION

This investigation was conducted as a part of Bureau of Medicine and Surgery Research Work Unit MF12.524.003-9008 — Evaluation of Submarine Crew Member and Diver Efficiency. This report is No. 1 on the above Work Unit. The manuscript was approved for publication on 15 May 1969, and designated as Submarine Medical Research Laboratory Report No. 579.

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ABSTRACT

A Medical Officer Questionnaire (MOQ), the Strong Vocational Interest Blank (SVIB) and the Allport-Vernon-Lindzey Study of Values (SV) were administered to 134 Prospective Submarine Medical Officers (PSMO's) and 105 Medical Officers (MO's) who had not volunteered for this branch of the service (NSMO's). All MO's in both groups held the rank of Lieutenant. The NSMO's were somewhat senior and had been on active duty for a longer time. Many of the NSMO's were in medical residency, an option not immediately open to the PSMO's. Moreover, most NSMO's who had not taken residencies planned to do so in the Navy, while most PSMO's planned to take residencies following their active military service. Compared to the NSMO's, the PSMO's had interest patterns more similar to physicians, engineers and physical scientists on the SVIB. It is possible that a program designed to apprise PSMO's of the professional and educational opportunities in the Navy early in their careers might be useful in promoting a more favorable retention situation.

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BACKGROUND AND MOTIVATIONAL CHARACTERISTICS OF MEDICAL OFFICER CANDIDATES FOR THE SUBMARINE SERVICE

INTRODUCTION

At the time this manuscript was being prepared there were approximately 4,600 billets for Medical Officers throughout the Navy. About 2½%-3% of these billets were at that time designated for the Submarine Service, 82 Medical Officers being assigned to Fleet Ballistic Missile Submarines (one to each of the two crews of the 41 ships in commission) and the remainder to the Fleet and Squadron billets or to some one or another research, clinical, or administrative billet. Annually, from 50 to 75 Medical Officers graduate from the School of Submarine Medicine at New London. Following this 23-week course, the Submarine Medical Officer candidates are given operational assignments within the Submarine Fleet. During this first assignment, most of the candidates complete their thesis and become qualified Submarine Medical Officers.

Exploratory in scope, this study was directed toward the population of Medical Officers who had volunteered for the Submarine Medical Program and were in the training and qualification phase at the time the data were collected. The overall goal of the investigation was to delineate the major background and trait patterns that characterize those Medical Officers who volunteer for the Submarine Service, as compared to a comparable group with other Naval assignments.

A survey of the literature failed to disclose any publications dealing directly with the subject matter of this paper. Four circumstantially related reports, however, will be noted. Somewhat analogous issues are considered in two opinion surveys of Army Medical Officers, one based upon returns of questionnaires mailed to over 2,000 Officers (DOD and HumRRO Joint Report, 1953) and another, more recent, letter opinion survey involving 1,994 Army MO's (Baker, 1969). Finally, two reports were addressed to the question of incentives for retaining Naval Officers (Harsh and Kinney, 1965; Weybrew, 1966), both based upon a variety of data collected from a sample of 10,000 officers across all designators, including 600 MO's.

In spite of the similarity of goals, the findings of these studies cannot be compared with the outcome of the present survey. Neither the detailed content nor the sampling procedure of the DOD-HumRRO Report were directly comparable with this study. A similar comment holds for the Harsh and Kinney as well as the Weybrew reports. Moreover, in the latter two reports data coding did not permit clear separation of Medical Corps and Dental Corps subjects and, perhaps more crucial, questionnaire content was directed primarily toward line officers and had only limited applicability to MO's.

METHOD AND PROCEDURE

Subjects

All Medical Officers in the Prospective Submarine Medical Officer (PSMO) group (N= 134) and the Non-Submarine Medical Officer (NSMO) group (N = 105) held the rank of Lieutenant. Data supplied by the Medical Officers (MO's) with ranks of Lieutenant Commander or higher were excluded both from the PSMO and NSMO groups in the interest of between-group comparability. The PSMO's completed the Medical Officer Questionnaire (MOQ), the Strong Vocational Inventory Blank (SVIB) and the Allport-Vernon-Lindzey Study of Values (SV), a few days after reporting for instruction at the Submarine Medical School, Groton, Conn.

The NSMO group (N=105) as stated above, were of equivalent rank and were drawn from the staffs of the Naval Hospitals located at St. Albans, Long Island, and Philadelphia, Pennsylvania. Identical test and questionnaire materials were completed by this MO group at their respective hospitals, and the data returned by mail to the Submarine Medical Research Laboratory, Groton, Connecticut, for analysis.

The two groups, however, were not strictly comparable since they were obtained by different sampling procedures. Accordingly, the PSMO group is an intake sample, whereas the NSMO group is a cross-section sample. It will be evident, as this paper progresses, that the contrast, dictated by practical difficulties in obtaining data, is a source of ambiguity at numerous points.

Questionnaire and Test Materials

Medical Officer Questionnaire (MOQ). The questionnaire developed for use in the present study was, in part, a modification of a questionnaire employed by the Institute of Naval Studies (INS) for an investigation of some of the factors related to the retention of Naval Officers across all designator classes (Harsh & Kinney, 1965). Many INS items were omitted and others were rewritten to deal specifically with the background and presumed career intentions of MO's. A few items were added to deal with the unique circumstance of Submarine Medical Officers. For example:

Source of First Commission:
_____ Ensign 1995 Program
_____ Ensign 1915 Program
_____ Berry Plan
_____ Entered Navy Upon Completion of Internship
_____ Entered Navy from Private (Or Other Civilian Practice)
_____ Other (Specify)

Have you qualified in Submarine Medicine?
_____ Yes _____ No

Medical Specialization Status:
_____ Board Certified
_____ Board Examined
_____ Board Eligible
_____ Residency Partially Completed
_____ In Residency
_____ No Residency

Strong Vocational Interest Blank (SVIB). The concept "interest" refers to rather persistent motivational trends in a person's life history. Interests differ from motives in that they are more persistent and tend to be less cyclic than, for example, hunger or thirst motives. In the past it has been customary to think of interests as rather superficial habits; however, modern psychology uses the concept dynamically as a reflection of underlying needs. In any event, attitudes, preferences and habitual activities associated with a field of endeavor or a body of knowledge (e.g., sports, science, art, etc.) may be used to identify areas of interest and to gauge the relative intensities of an array of occupational activities. The 400 SVIB items consist of names of occupations, school subjects, and amusements (sports, reading material, etc.), to each of which the respondent affixes an "L" to indicate liking the occupation or activity, an "I" for indifferent to it, or a "D" to mean he tends to dislike it. Up to 40 interest scores may be derived from the SVIB by summing the item responses each weighted by the degree to which a given pattern of interests has been shown empirically to characterize the occupational grouping of concern, in this study for example, physicians. Obviously, this measurement approach assumes that the more closely the examinee's pattern of interests fits the average profile of a sizable sample of persons actively engaged in the occupation in question, the more intense and possibly the more appropriate is his motivation for the indicated specialty. The retest reliabilities for most of the SVIB subtests are of satisfactory magnitude and are quite typical for inventories of this kind, e.g., .75—.87 (Strong, 1945).

Four subtest or occupational grouping scores were of concern in this study. First, the SVIB interest profiles for physicians were examined with a view toward exploring the notion that Medical Officers who volunteer for the Submarine Service have quite disparate interest patterns as compared to those who are members of other branches of the Navy. Secondly, SVIB Engineering profiles were constructed in view of an often-cited assumption that the duties of the SMO, particularly if he is assigned to a diving facility, often overlap with those of the engineer. Similiarly, a third SVIB score, that of the physicist, was also evaluated largely based upon the assumption that the SMO's necessary concern with the physical parameters

associated with compression and decompression sickness and his willingness to devote considerable time and effort to problems of this nature may be indicative of a tendency for the interest patterns of the two professions to coalesce in some respects.

Finally, a composite SVIB score, the so-called Group II index, was calculated for all of the MO's by simply summing the raw scores for the scientist, engineer, and mathematician. The Group II score was included in the present study to test the notion that SMO interest patterns were more or less congruent with those for the scientist, engineer and mathematician.

The use of SVIB in military settings is limited quite possibly by the fact that substantial normative profile data for military populations generally, and for the Naval Submarine Service in particular, are virtually nonexistent. As a result, for most effective usage of the SVIB with military populations, it is necessary to construct special purpose item keys validated with respect to the criterion of concern. For example, a very recent study demonstrated useful validity for a "custom-tailored" SVIB key constructed, item-for-item, with attrition data obtained from a large sample of NROTC graduates (Abrahams, Neumann and Githens, 1968). Obviously, for the present study, no such keying procedure was possible since there were no SVIB normative data for Navy Medical Officer populations available. However, for future studies, it may be useful to develop special purpose keys for the SVIB or other test instruments, the keyed scores to be validated against some practical criterion such as extension beyond obligated "tours" of duty and/or probability of retention until full career retirement.

Allport-Vernon-Lindzey Study of Values (S-V). Values may be defined as culturally-relative preferences. Closely akin to attitudes, the concept "value" as a descriptive aspect of personality places culturally defined goals or behaviors on a good/bad, relevant/irrelevant, approval/disapproval continuum.

Since values imply choice, the construction of a measurement technique becomes rather straightforward as may be seen by an examination of the Allport-Vernon-Lindzey Scale used in the present study (Allport, Vernon, Lindzey, 1951). Accordingly, the Study of Values (SV) allows the respondent to choose in a multiple choice manner, the alternative most consistent with his value system. An example of one of the items is: If you were a university professor, which would you prefer to teach? (a) Poetry, or (b) Chemistry and Physics.

The SV consists of six, 20-item subtests, each purported to measure one of six classes of values corresponding to Spranger's personality types (Spranger, 1928). A brief statement regarding the content of each of the six value subtests follows: (Weybrew and Molish, 1959)

"The **Theoretical** value scale is aimed at 'tapping' motivation to seek out empirical knowledge in pursuit of a goal to discover the 'truth' about the phenomena in the environment. In a sense, the scale gets at scientific attitudes. The **Economic** value scale taps interest in business, production, marketing, and so on. It might be said that this scale 'gets at' attitudes consistent with the average American business man. The **Aesthetic** value scale attempts to determine the strength of the motivation to seek out beauty in form and harmony in the environment. In a sense, this scale attempts to dimension the intensity of artistic interests. The **Social** value scale attempts to dimension humanitarian motives, particularly with respect to altruistic or philanthropic components. The **Political** value scale attempts to dimension what has been called the 'power' motive, that is, motivation to seek environmental situations in which the opportunities for personal power, influence, and renown are maximized. Finally, the **Religious** value scale attempts to dimension certain philosophical interests (values), in particular, the intensity of the personal motivation to comprehend the cosmos as a whole and to relate himself to this totality. Obviously, the need-goal relationships from which the intensity of the religious motivation is inferred is quite abstract and may well 'tap' the more general profound need for intellectual stimulation of most any kind. The scale does not, as the title may indicate, attempt to tap attitudes toward organized religion." p. 12.

RESULTS

Most of the descriptive data for the two MO groups were obtained by means of the MOQ and for that reason, these findings will be presented first, followed by a brief examination of the interest and value test score patterns.

Background Characteristics

Age and Seniority. As already noted, only MO's holding the rank of Lieutenant were selected for the analysis in the interest of keeping the two groups as comparable as possible. However, the NSMO's were somewhat older and professionally senior, to the PS MO's. The mean year of birth of the PSMO group was 1938.8 compared with 1937.2 for the NSMO group, a difference significant at ($p<.005$). As a group, the NSMO's were first commissioned significantly ($p<.005$) earlier than the PSMO's (Table I). It should be mentioned however, that data pertaining to year of first commission are somewhat difficult to interpret since this date did not, in all cases, coincide with the onset of active military service. However, assuming there is some gross relationship between date of commission and active duty time, the fact that disproportionately more PSMO's had held their commissions less than 2 years (33% as compared to 20% for NSMO's) and fewer (33% as compared to 15% for the NSMO's) of the same group had been commissioned prior to 1958, argue for the relative seniority of the NSMO group. Moreover, the finding in Table II that 24% of the total NSMO group (as compared to 5% of the PSMO's) had more than 1 year of sea duty, appears to provide additional support for the same general conclusion. Finally, the family data (Table III) are in keeping with the same observation inasmuch as the NSMO's tended to have larger families ($p<.05$), though the groups were alike in terms of marital status distributions.

Table I.—Source and Approximate Date of Commission

Source of Commission				Year of Commission		
	PSMO(%)	NSMO(%)			PSMO(%)	NSMO(%)
Source	(N=133)	NR[a] (N=79)	R[a] (N=26)	Years	(N=121)[b]	(N=94)[b]
Ensign 1955 Program	4.5	5.1	7.7	1953-1955	—	4.3
Ensign 1915 Program	56.4	64.5	7.7	1956-1958	3.3	10.6
Berry Plan	16.6	5.1	38.5	1959-1961	30.5	21.3
Entered Navy Following Internship	12.8	5.1	3.8	1962-1964	33.1	43.6
Entered Navy From Civilian Practice	2.2	1.2	15.4	1965-1967	33.1	20.2
Other	7.5	19.0	26.9			
	With df=4, p of $x^2=.05$				With df=3, p of $X^2=.005$	

[a]NR refers to MO's in the NSMO group with no resident experience or with incomplete resident training.

R refers to those who are Board Eligible or Certified.

[b]Data were missing from 12 of the PSMO and 11 of the NSMO Groups.

Table II.—Amount of Sea Duty at the Time of Study

Sea Duty	PSMO(%) (N=129)[b]	NSMO(%) NR[a] (N=78)[b]	NSMO(%) R[a] (N=26)
None	89.9	60.2	84.6
Less than 1 year	4.7	9.0	11.5
1 Year or more	5.4	30.8	3.9
	With df=4, p of X^2 <.05		

[a]NR refers to MO's in the NSMO group with no resident experience or with incomplete resident training. R refers to those who are Board Eligible or Certified.

[b]Data were missing from 12 of the PSMO Group and 11 of the NSMO Group.

Medical Specialization Status. The most striking contrast between the two groups of MO's in this survey is indicated in Table IV. About one-fourth of the NSMO's were either board eligible or board certified compared with only one board eligible MO in the PSMO group. Of the PSMO's, 87.3% had no history of a medical residency. The comparable value for the NSMO's was 46.7%. It seems reasonable to conclude that the board eligible and board certified NSMO's represent a population essentially different from the principal source of PSMO's. For the remainder of this paper, therefore, in the analyses of those variables which are most probably affected by this sampling problem, this group will be treated separately and will be hereafter designated as the Non-Submarine Medical Officer (Residency) group (NSMO-R). The remaining 75.3% of the MO's assigned to the hospitals will be referred to as the NSMO-NR group, "NR" (non-residency) to indicate that none of this group had completed a residency though some (38%) had some residency experience at the time.

Table III.—Marital Status And Number of Children by the Medical Officers in Both Groups

	PSMO(%) (N=133)	NSMO(%) NR[a] (N=79)	NSMO(%) R[a] (N=26)
Married	79	85	88
Not Married	21	15	12
	With df=1, p of X^2=n.s.		
	PSMO(%)	NSMO(%) NR	NSMO(%) R
Number of Children in Married Families	(N=105)	(N=67)	(N=24)
None	37	15	12
One	36	25	17
Two or More	27	60	71
	With df=2, p of X^2=.001		

[a]NR refers to MO's in the NSMO group with no resident experience or at least had not completed a residency. R refers to those who are Board Eligible or Certified.

Table IV.—Medical Specialization Status

Present Status	PSMO(%) (N=134)	NSMO(%) (N=105)
No Residency	87.3	46.7
Some Residency Training	11.9	28.6
Board Eligible or Certified	0.8	24.7
With df=2, p of X^2<.01		

Specialization Plans[a] Plan to Take Residency In: The Navy	PSMO(%) (N=117)	NSMO(%) (N=49)
Yes	6.5	40.8
Probably	15.4	16.3
No	0.8	4.1
Totals	22.7	61.2
After Leaving Navy		
Yes	41.5	30.7
Probably	28.2	6.1
No	7.6	2.0
Totals	77.3	38.8
With df=4, p of X^2<.01		

[a]Includes those MO's in both groups who have never had a residency.

Some additional comments pertaining to the composition of the MO groups appear to be in order. Returning briefly to Table I, it is noted that fewer of the NSMO total group (as compared to the PSMO group) came directly from internship to their first duty station, 60% for the former and 74% for the latter.* With the NSMO-R group (N=26) removed, the NSMO-NR becomes almost identical (75%) with regard to the proportion entering the service directly from internship. To be noted also is the expected finding that 10 of the 26 officers in the NSMO-R group entered the service under the provisions of the Berry Plan while a much smaller percentage of the NSMO-NR and PSMO groups entered under this particular residency plan, (5.1% and 16.6% in the above order). To repeat, the NSMO-NR appears to be more comparable to the PSMO group in several respects and, as a result, these two groups will be focused upon for certain of the comparative analyses to follow.

Plans for Medical Specialization. With board eligible and board certified MO's excluded from the data in Table IV, 12.0% of the PSMO's had some residency training while 38.0% of the NSMO-NR's had some prior residency or were in residency at the time of the study. The contrast between these groups in this respect is not surprising per se, since a number of the NSMO-NR's were engaged in a residency program at one of the Naval hospitals at the time these data were obtained. It appears possible at least that the choice of the Submarine Service may be linked to a lack of interest in professional training within the Navy.

The foregoing suggestion is supported by the data on the right side of Table IV. Of the 117 PSMO's with no residency training, only 21.9% indicated definite or probable plans to take residency in the Navy, while 69.7% indicated they would or probably would take residency after leaving the Navy. In contrast, of the 49 NSMO-NR's with no residency training, 57.1% indicated they would or probably would take residency in the Navy and 36.8 after termination of active duty.

The data yields practically no clues as to possible cause-effect relationships. One seemingly plausible view is this: whatever motivation leads a MO to volunteer for the Submarine Service, once his choice is made, the option of an immediate medical residency is precluded; hence, there is little reason for him to plan on one. There is a second and highly relevant factor which is not apparent in the tabulated data, but of which the investigators are acutely aware. The PSMO's filled out the questionnaire (MOQ) only a few days after reporting for submarine medical training and in many cases, after only a few weeks' active military duty spent in an indoctrination program. Many, perhaps it is reasonable to say most, of the PSMO's responded to the questionnaire at a time when there was little reason to assume they were sufficiently familiar with training opportunities in the Navy to make realistic plans. In contrast, the NSMO sample was a cross section of MO's assigned to the Naval hospitals at a point in time, which would imply that as a group, their responses to the questionnaire may have been based upon a longer and more varied experience in the Navy resulting in their being more aware of the educational programs available to the Navy Medical Officer.

Another questionnaire item, perhaps less complicated by differences between military service experience pertains to the motivation to join the Navy in the first place, and general satisfaction with the service after the onset of active duty. In brief, both groups of MO's were asked to what extent their decision to join the Navy was influenced by interests in the benefits of subsidized education and professional training. These data are presented in Table V.

Of the NSMO-NR's, 58.7% indicated they were much influenced compared with 31.1% of the PSMO's, almost a two-to-one ratio (Table V). Similarly, almost identical difference patterns were found for these two groups when asked for an opinion as to the degree to which the Navy had satisfied their

*These percentages are obtained by summing the two Medical Clerkship groups (Designators 1955 and 1915) with the category in Table I labeled, "Entered Navy Following Internship."

expectations. These differences, found in the response distributions, however, are a question of degree, not a simple "yes" or "no" situation. If the "some" and "much" categories for both items in Table V are combined, the contrast between the groups vanishes.

Table V.—The Incentive Value of Subsidized Education And Professional Training For Medical Officers

	PSMO(%) (N=132)	NSMO-NR(%)[a] (N=75)	NSMO-R(%)[a] (N=26)
Influence on Decision To Join Navy:			
None	26.5	21.3	69.2
Some	42.4	20.0	23.1
Much	31.1	58.7	17.7
	With df=4, p of X^2=.001		
Satisfaction in Navy:	(N=114)	(N=75)	(N=25)
None	20.2	18.6	20.2
Some	43.8	22.7	43.9
Much	36.0	58.7	35.9
	With df=4, p of X^2=.02		

[a]NR refers to MO's in the NSMO group with no resident experience or at least had not completed a residency. R refers to those who are Board Eligible or Certified.

It should be noted that the group differences discussed above do not suggest the PSMO's as a group are less interested in professional training than their peers elsewhere, but that they do expect less from their Naval experience in this respect and their plans are less firm. This is attested to the fact that nearly all the MO's who had no residency indicated at least probably they will take one (Table IV).

Somewhat unexpectedly, the areas of specialization or interest in various fields of medicine indicated by the PSMO's and NSMO's showed no statistically significant differences (Table VI). It might be noted in passing, however, that there were sizable (though not statistically reliable) differences in interest and specialization categories. For example, disproportionately more PSMO's indicate interest in surgery and radiology and less in anesthesiology. No interpretation of these differences is indicated at this time.

Table VI.—Areas of Medical Specialization of the Medical Officer Groups[a]

Specialty	PSMO(%) (N=129)	NSMO(%) (N=98)
General Practice	6.2	6.1
Pediatrics	7.0	6.1
Surgery	18.6	12.2
Urology	3.1	5.1
Pathology	3.9	5.1
Internal Medicine	15.5	17.3
Anesthesiology	3.9	15.3
Orthopedics	6.2	8.2
Obstetrics-Gynecology	7.0	8.2
Psychiatry	2.3	8.2
Radiology	7.0	1.0
Dermatology	2.3	1.0
Otolaryngology	—	1.0
E.E.N.T.	4.7	—
Neurology	2.3	1.0
Cardiology	—	1.0
Pharmacology	0.8	—
Plastic Surgery	4.7	—
Ophthalmology	4.7	3.1
With df=9, p of X^2=n.s.		

[a]Includes both MO's with specialization history as well as those with stated interest in each area.

While there are no remarkable differences in the number of graduate degrees other than M.D. awarded to the PSMO's and NSMO's, the PSMO's plan to take significantly ($p < .05$) more graduate degrees, mostly at the Master level (Table VII).

Table VII.—Graduate Degrees (Other than M.D.) Awarded and Planned for by the Two MEDICAL OFFICER GROUPS

	Graduate Degrees Awarded (%)		Planned Graduate Degree (%)	
Degrees	PSMO (N=115)	NSMO (N=97)	PSMO (N=113)	NSMO (N=94)
MA/MS	6	6	12	3
PhD	0	2	7	3
Other	10	4	4	5
None	84	88	77	89
	With df=1, p of X^2=n.s.		With df=1, p of X^2=<.05	

Career Intentions. As indicated in Table VIII, notably more NSMO-NR's (38.0%) than PSMO's (12.0%) expressed intentions of extending their careers in the Navy beyond periods of obligated duty. Although

the difference is highly significant statistically ($p < .001$), possible implications of the data are by no means evident. A first impression was that the considerable proportion (42.2%) of the PSMO's who indicated they were undecided about their career intentions (Table VIII), may possibly include a number of potential career MO's. However, it was reported in a separate survey of a class of PSMO's in which their responses were anonymous, that only 6% of the class (N = 43) expressed interest in Naval service beyond their obligated duty.* It is interesting to note that about 85% of those in the NSMO-R group plan to leave the Navy after their obligated tours (none plan to stay in to a full career retirement) while fewer PSMO's and NSMO-NR's (37% and 33% respectively) indicate this decision. As indicated earlier, NSMO's as a group had more active duty at the time of this study and, therefore, a greater opportunity to evaluate career prospects in the Navy. As their knowledge of career possibilities in the Navy grows, one would expect more of the PSMO's to become interested in Naval careers. It might at least be of interest in passing to note that Harsh and Kinney (1965), in a stratified-random sample of 589 MO's (across all ranks) reported that about 50% planned to leave the Navy after their obligated "tour" and about 34% planned to stay to retirement after 20 years or longer.*

Table VIII.—Career Intentions of the Medical Officer Groups

Career Intentions	PSMO(%) (N=133)	NSMO NR[a](%) (N=79)	NSMO R[a](%) (N=26)
Undecided	42.2	27.8	11.5
Leave Navy after completing obligated duty	17.3	21.5	61.6
Leave Navy after obligated duty but hold Reserve status	19.5	11.4	23.1
Stay in 6-16 years	3.0	16.4	3.8
Retire after 20 years	6.0	8.9	—
Continue Navy Career as long as possible	3.0	12.7	—
No data available	9.0	1.3	—
With df=3, p of X^2=.02			

[a]NR refers to MO's in the NSMO group with no resident experience, or with some incomplete resident training. R refers to those who are Board Eligible or Certified.

Interest Patterns. The Medical Officers were asked to indicate the extent to which a variety of factors influenced their decisions to join the Navy. Two factors which may have some relevance to the choice of submarine duty are summarized below.

Table IX.—Interests Related To Submarine Duty Influencing Medical Officer Decisions To Join The Navy

Degree of Interest	PSMO(%) (N=113)	NSMO-NR(%)[a] (N=75)	NSMO-R(%)[a] (N=25)
Interest in the Sea and Shipboard Life			
None	19.5	56.0	72.0
Some	44.2	21.3	28.0
Much	36.3	22.7	—
with df=2, p of X^2=<.01			
Opportunity to Work with Complex, Advanced Equipment Systems			
None	37.5	73.4	84.0
Some	33.9	21.3	16.0
Much	28.6	5.3	—
with df=2, p of X^2=<.01			

[a]NR refers to MO's in the NSMO group with no resident experience, or with some incomplete resident training.
NSMO-R refers to those who are Board Eligible or Certified.

*These unpublished data were provided by LCDR Eric P. Kindwall, MC, USN, who in 1967, when the data were collected, was a member of the faculty of the School of Submarine Medicine, Submarine Medical Center, Groton, Connecticut.

*There were some similar, but not exactly comparable, data reported by the Army in 1953 in which 12% of the 437 MO's sampled planned to "stay in," 5% definitely to go out and 29% were uncertain about the decision (HumRRO, 1953). Another, more recent, Army study reported that 29% planned to stay, 45% to leave and 26% undecided, (N=1946 across all ranks, Baker, 1969).

First, 80.5% of the PSMO's indicated that at the time they joined the Navy, their decisions were influenced to some extent by interest in the sea and shipboard life (Table IX). Only 44.0% of the NSMO-NR's reported that they were influenced by similar interests. Second, 62.5% of the PSMO's, but only 26.6% of the NSMO-NR's, indicated that the opportunity to work with complex, advanced equipment systems influenced their decisions at the time they joined the Navy.**

As indicated in the methods and procedure section of this paper, the Strong Vocational Inventory Blank (SVIB) for both groups of Medical Officers and for one group of Line Officer candidates for the Submarine Service were scored according to the published interest profiles for three professional groupings, Physicians, Engineers and Physicists, and for one composite profile (SVIB Group II) for the Scientist, Engineer and Mathematician (SVIB Group II Score, Strong 1951). These data are presented in Table X.

Table X.—Strong Vocational Interest Blank (SVIB) Subtest Scores

SVIB Subtest Scores[a]	I. PSMOS[b] (N=122) Mean	σ	II. N-SMOS[b] (N=101) Mean	σ	III. PSOS[b] (N=124) Mean	σ	Significance Tests Groups	t	p of t
Physician	40.3	5.4	37.8	6.7	31.6	6.5	I-II	3.1	<.01
							I-III	11.5	<.01
							II-III	3.1	<.01
Engineer	35.2	9.4	35.1	10.7	40.9	11.2	I-II	.1	n.s.[c]
							I-III	4.3	<.01
							II-III	4.0	<.01
Physicist	24.8	5.3	23.8	4.9	23.4	4.9	I-II	1.5	n.s.
							I-III	2.2	<.05
							II-III	0.6	n.s.
Group II[d]	58.4	42.3	47.6	46.6	58.7	47.1	I-II	1.8	n.s.
							I-III	0.1	n.s.
							II-III	1.8	n.s.

[a]In standard score form except Group II scores which are raw scores.

[b]PSMOS—Prospective Submarine Medical Officers; N-SMOS—Non-Submarine Medical Officers; PSOS—Prospective Submarine Officers (Line).

[c]n.s.—Non-significant, i.e., nul probability ≥5% (Two-sided Test).

[d]See text for a description of this test score.

**In the unpublished survey mentioned earlier (Footnote, p 7), the majority of the 43 PSMO's indicated (anonymously) that their major reasons for volunteering for the Submarine Service were: interest in diving medicine, interest in serving aboard a submarine, and submarine service is the best General Medical duty in the Navy.

It is to be noted at the outset that the scores for the specific vocational subtests, namely, Physician, Engineer, and Physicist are in standard score form, whereas the Group II scores are simply summed raw scores.

Considering first the profiles for physicians, an expected finding is immediately apparent, that is, that both MO groups fit the interest patterns of physicians more closely than do the line officer group. Also to be noted is the small, but non-chance difference between PSMO's and NSMO's suggesting that physicians who volunteer for the Submarine Service yield interest patterns on the SVIB more like "physicians in general" than do MO's in other branches of the Navy. However, it might be mentioned in passing that both MO groups produce interest profiles well below the means for various, presumably representative, samples of civilian physicians, the most recent of which reports a mean of 47 for this scale (Strong, 1959). One might construe the latter finding to indicate that physicians who become MO's in the U. S. Navy have somewhat different interest patterns than do civilian physicians. This interpretation might be plausible were it not that the civilian normative data cited above for comparison purposes is based upon samples from a much more senior physician population, mean age 40, as compared to a mean age of 27 for the MO samples. Whereas there is considerable evidence that interest patterns of adult populations generally are relatively permanent (Strong, 1951), it cannot be gainsaid that the interest patterns of physicians in different age groupings may be quite different irrespective of whether or not they are in military uniform. Obviously, to examine this point critically, one would need SVIB data from senior MO's who would be of comparable age.

The general notion that PSMO's have Engineering interests similar to Navy Line Officers who volunteer for the Submarine Service is not supported by the data in Table X. Moreover, it is well to note in this context that not only the mean interest scores for the two MO groups are almost identical, but that the individual differences within each group are sizable and approximately equal. In short, these findings suggest considerable variability among physicians in Naval uniform generally, but do not support the engineering-interest bias often assumed for PSMO's.

Turning now to the interest patterns for physicists, the possibility is disclosed that PSMO's tend to have interests more in common with physicists than do Line Officer candidates for the Submarine Service. This difference, which is small and may be of no practical significance (though non-chance), nonetheless may indicate a greater interest of the PSMO's in academic pursuits in a "hard" science area.

Tending to support the notion that of an exaggerated interest of PSMO's in scientific matters is to be found by an examination of the SVIB Group II scores in Table X. Here it is seen that the PSMO's are almost identical in interest profiles in the science mathematics and engineering areas as compared to line officers. Moreover, the interest pattern of the PSMO's fits the interest profiles of scientists and engineers generally more closely than do NSMO's (in one direction only, nul probability = 3%). Finally, the fact that disproportionately more of the PSMO's, as compared to the NSMO's, plan to take advanced academic degrees (Table VII) may also be interpreted as a further reflection of the differences in scientific interests of the two MO groups.

Value Profiles

Data obtained by means of the Allport-Vernon-Lindzey Study of Values (SV) were collected from one group of Line Officer candidates for the Submarine Service in 1959 (Weybrew & Molish, 1959), and from another similar group in 1967. These two samples together with a sample of male civilian college graduates provided by the test authors (Allport et al., 1951) are presented for comparison with the data collected from the two MO groups.

At the outset, it is seen that the differences between the two MO groups on each of the SVIB subtests are small and statistically insignificant according to the agreed

upon confidence criterion of 5%. Although of only tangential interest for the purpose of this study, it is noted that Line Officers who volunteer for the Submarine Service have profiles higher in Economic and lower in Aesthetic values as compared to either MO group. Finally, and still only of passing interest, is the finding that the Navy Officers, both the Medical and Line officers in these four samples, tend to show higher value preferences in the Theoretical areas and lower in Social areas than do male college students in general. This finding appears to be consistent with the differences in academic training of the officer groups (engineering, hard science, medicine and biology) as compared to the random sample across assorted subject matter areas including social science, humanities and arts.

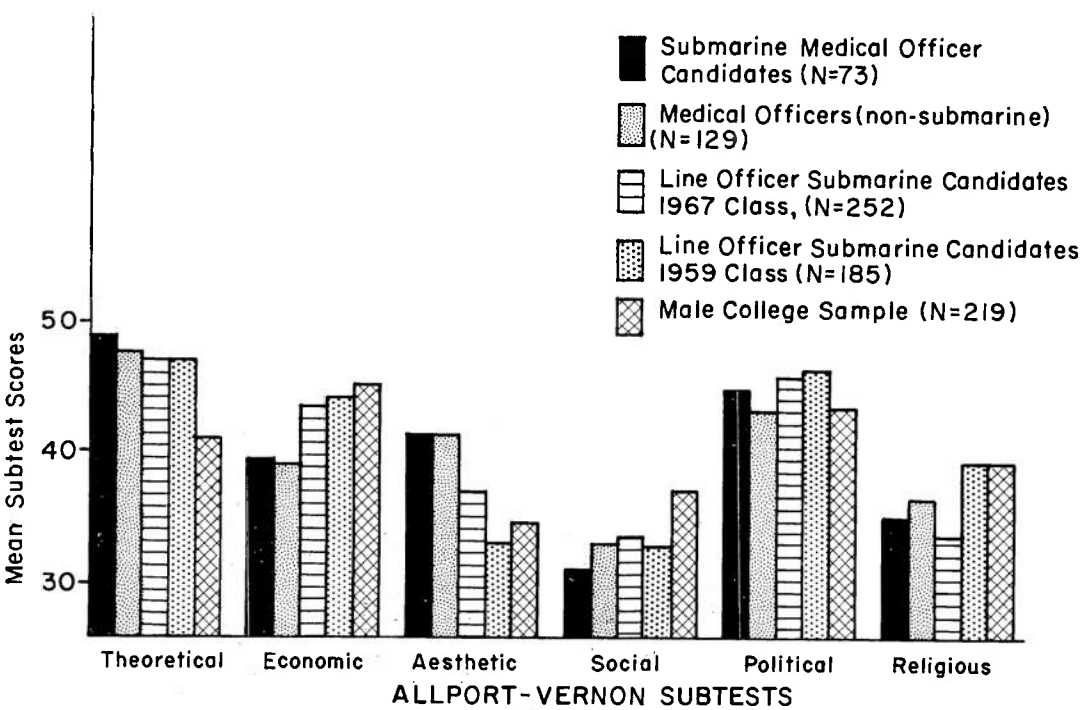

Figure 1.—Comparison of Mean Scores for Each of the Six Value Subtests

SUMMARY AND DISCUSSION

The purpose of this study was to ascertain whether there were identifiable factors characterizing the Medical Officers (MO's) who volunteered for the Submarine Service as compared to those MO's of equal rank who had not and who did not intend to volunteer for this branch of the Navy. Accordingly, "custom-tailored" background questionnaires, the Strong Vocational Interest Blank (SVIB) and the Allport-Vernon-Lindzey Study of Values (SV) were administered to 134 PSMO's (Prospective Submarine Medical Officers), all with the rank of Lieutenant and to 105 equal ranked MO's who had not volunteered for the Submarine Service and who were assigned to Naval Hospitals along the eastern seaboard at the time of the study.

In interpreting the background questionnaire data, it was discovered at the outset that the 105 NSMO group, although of equal rank with the PSMO's, nevertheless were older and had more active duty time and sea duty. In fact, in comparing the PSMO and NSMO groups with respect to career experience, career intentions and the like, the 26 more senior Lieutenants in the NSMO group (those who had completed a residency) were removed from that group in the interest of making the two groups more comparable.

In terms of specialization plans of the MO's who had no residency history, disproportionately more of the NSMO group (as compared to the PSMO's) indicated plans to take residencies in the Navy and fewer of the same group planned civilian residencies (Table IV). This finding, that disproportionately more of the NSMO's plan Navy residencies, would appear to be related to the differences in stated career intentions of the two groups, namely, that more of the NSMO's than the PSMO's indicated plans for a full retirement career (Table VIII).

However, it should be pointed out in interpreting these findings that at the time the data were collected, most of the PSMO group had reported direct from internship to active duty at the Submarine Medical School. The NSMO's on the other hand, had more active time and quite likely a more varied experience in the Navy. The fact that 42% of the PSMO's were "undecided" about a career in the Navy (Table VII) is consistent with the presumption that they had been on active duty for such a brief time that they were quite possibly unaware of the professional opportunities that a Navy career might provide.

Data bearing directly on the question of why certain MO's volunteer for the Submarine Service are not provided in any measure by this study. Table V suggests that opportunities for professional growth may have been a consideration for about 75% of the PSMO's and for an approximately equal proportion of the segment of the NSMO group who had not completed a residency. Interest in the sea and in the opportunity to work with complex equipment may also have been a factor (Table IX). These findings, including some additional data not directly a part of this study (see footnote p. 8)) argue that interest in diving medicine generally, interest in "serving aboard a submarine" and rather simply the expectancy that the Submarine Service provided relatively the best general medical duty in the Navy, all probably contributed to the decision to volunteer for this branch of the service.

Whereas there were no statistically significant differences in the Allport-Vernon value profiles of the PSMO's as compared to the NSMO's, there were some significant differences in certain areas of interest as measured by the Strong Vocational Interest Blank (SVIB). In the first place, the SVIB profiles for the PSMO group were more like the interest patterns for physicians generally than were those of the NSMO group. Secondly, the fact that the PSMO's yield SVIB profiles more similar to that of "physicists in general" than the profiles provided by the line officers may indicate some trends toward the hard sciences area. Possibly consistent with the greater interest in science is the higher Group II (Science, Engineering and Mathematics) composite mean score for PSMO's as compared to the NSMO's. The fact that the PSMO Group II score was almost identical with that found for the line officer sample may lend some credence to the assumption that MO's who volunteer for the Submarine

Service (but not the NSMO's) have interests similar to line officer volunteers for the same branch of the service. Tending to contraindicate this finding however, insofar as specific engineering interests are concerned, is the finding that the mean SVIB Engineering Scores are much lower (less like engineers' profiles) than those found for line officers. The similarity of the SVIB Group II profiles for the PSMO's and the Line Officers could, of course, be accounted for by common interests in non-engineering areas such as in mathematics and in science generally.

In brief, this study has provided data indicating some background and interest differences between those MO's who volunteer for the Submarine Service and those officers of comparable rank who have not volunteered for this branch of the Navy. These findings, while suggestive, nevertheless are limited by the fact that the MO's in the NSMO group tended to have a longer and more varied experience background in the Navy as compared to the PSMO's most of whom had come to the Submarine Service directly from internship. Future studies along similar lines ideally should schedule the data collection from both the PSMO's, and the NSMO's during the first 2 or 3 months of active duty. Comparison of background factors, attitudes, interests and career intentions of these two more closely matched groups should delineate similarities and differences unconfounded by differing amounts of service experience.

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13. ABSTRACT

A Medical Officer Questionaire (MOQ), the Strong Vocational Interest Blank (SVIB) and the Allport-Vernon-Lindzey Study of Values (SV) were administered to 134 Prospective Submarine Medical Officers (PSMO's) and 105 Medical Officers (MO's) who had not volunteered for this branch of the service (Non-Submarine Medical Officers--NSMO's). All MO's in both groups held the rank of Lieutenant. The NSMO's were somewhat senior and had been on active duty for a longer time. Many of the NSMO's were in medical residency, an option not immediately open to the PSMO's. Moreover, most NSMO's who had not taken residencies planned to do so in the Navy, while most PSMO's planned to take residencies following their active military service. Compared to the NSMO's, the PSMO's had interest patterns more similar to physicians, engineers and physical scientists on the SVIB. It is possible that a program designed to appraise PSMO's of the professional and educational opportunities in the Navy early in their careers might be of service in promoting a more favorable retention situation.

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